Venn diagrams

- To be able to understand and use Venn diagrams to solve problems
- To be able to understand the notation P(A), P(A'), P(A U B), P(A n B)

Recap

1) Increase £150 000 by 20%

2) Decrease £965 by 15%

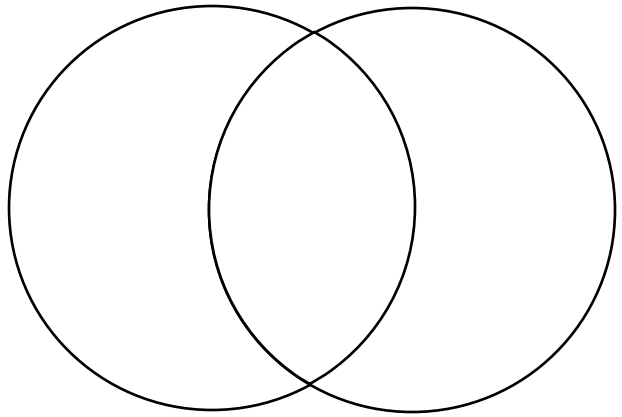
Recap

1) In a storm 144 fruit trees were left standing out of 180 fruit trees in an orchard. What is the percentage change in the number of trees?

What are they?

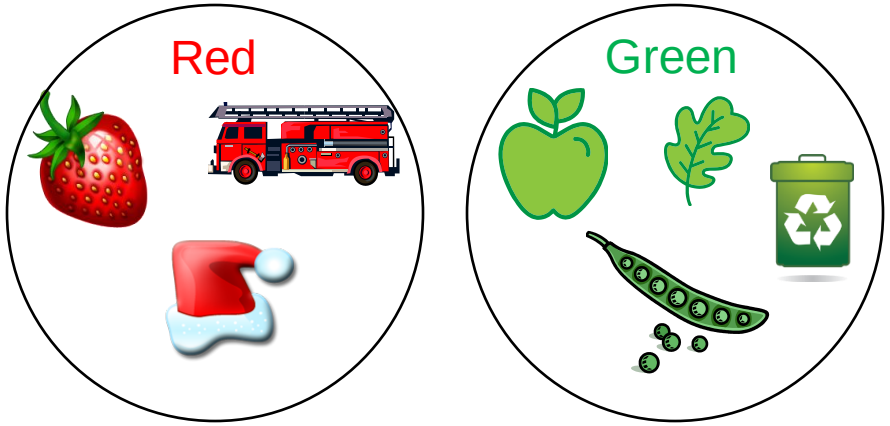
A Venn diagram is a tool used for sorting objects into groups that have the same criteria.

Sometimes the object can be placed in both groups. This is when the circles need to overlap. This object can then be placed in the overlapping section which represents both groups.

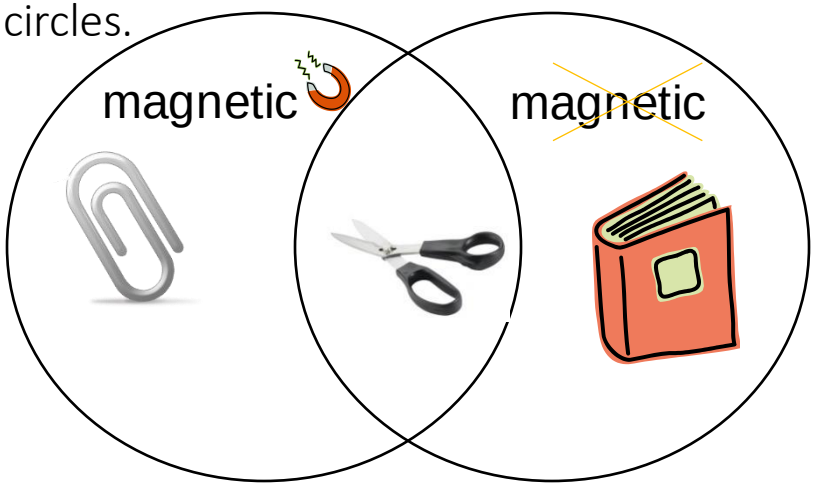


Venn diagrams explained

This group of objects are sorted into two separate Venn diagrams



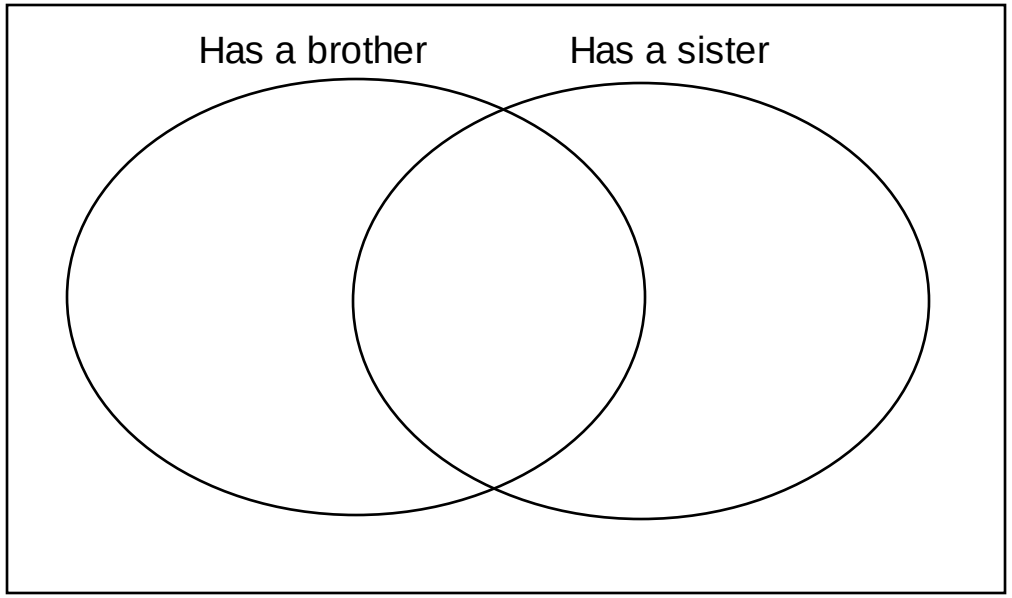
This Venn diagram is made of two overlapping circles.



This Venn diagram is made of three overlapping circles.

Your turn!

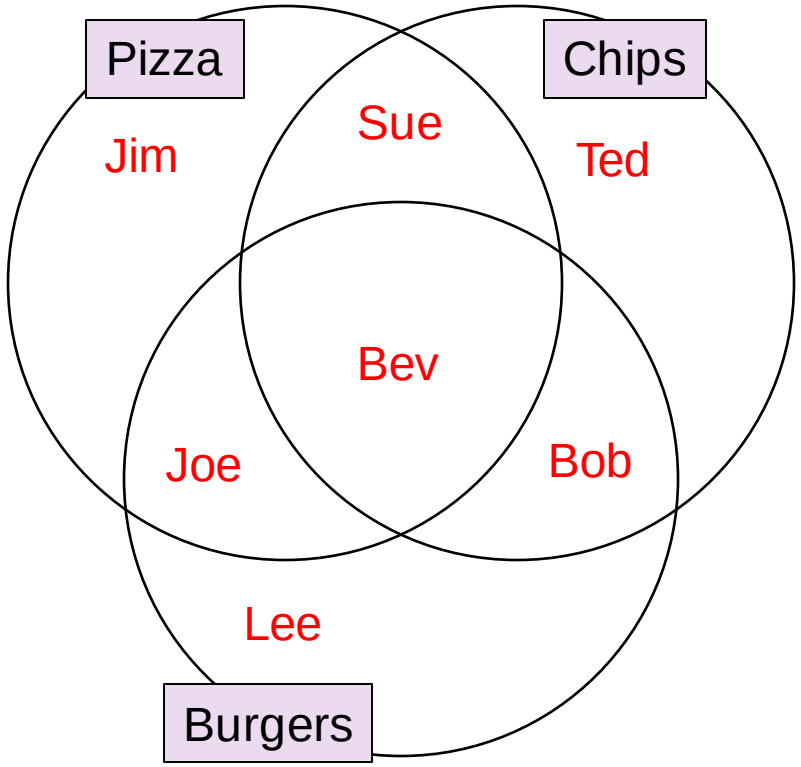
Copy this Venn diagram.
Fill it with names of students in your class.
Make sure you put their name in the correct place!



Further practice

This table shows foods that 7 friends like. Draw a 3-way Venn diagram and put the names in the correct places.

	Pizza	Chips	Burgers
Jim	✓		
Ted		✓	
Lee			✓
Sue	✓	✓	
Joe	✓		✓
Bob		✓	✓
Bev	✓	✓	✓



Practice

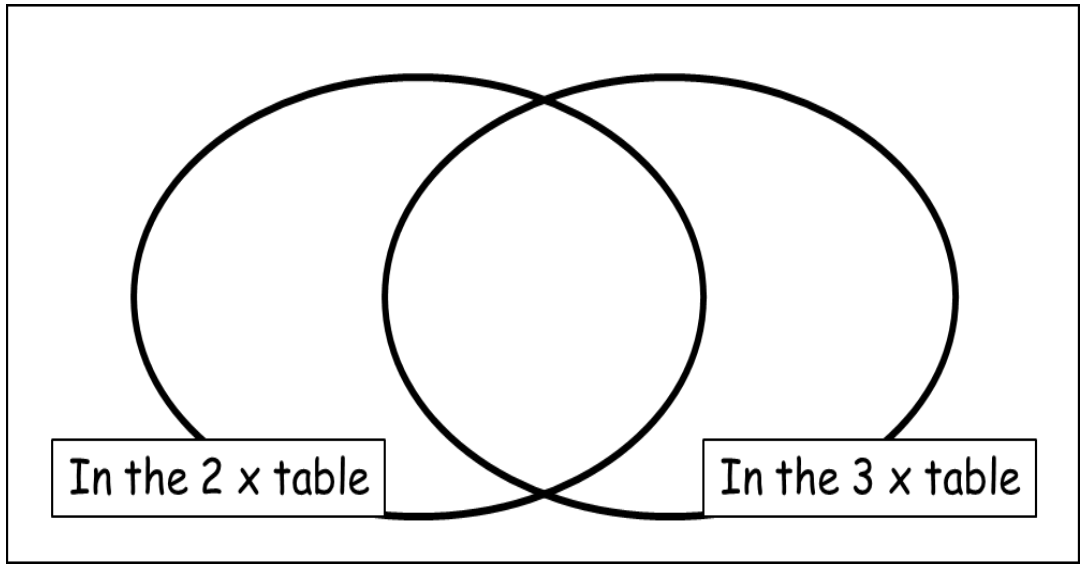
- Complete this Venn diagram for numbers 1 – 20. Cross them off as you go to make sure you've included all of them.

1 2 3 4 5

6 7 8 9 10

11 12 13 14 15

16 17 18 19 20

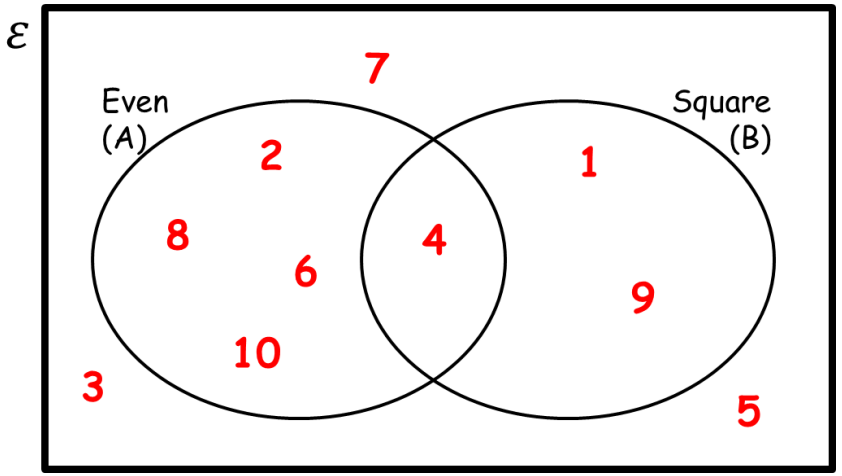


Venn notation

Sets come with strange notation, but a set is just a word for a collection of things.

Each thing in a set is called an element or member.

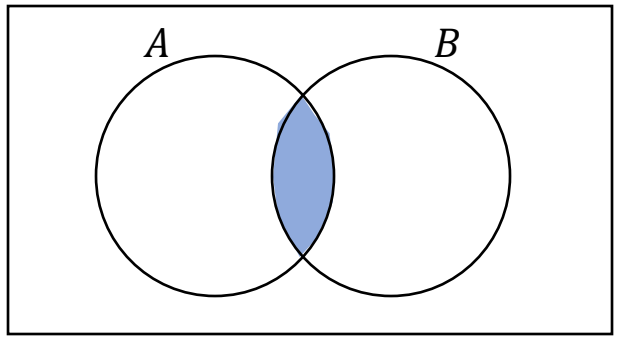
Capital letters represent a set, and lower case letters represent elements.



Notation

$A = \{\dots\}$	A is the set of…
$x \in A$	x is an element of A
$y \notin A$	y is not an element of A
$n(A)$	the number of elements in set A
ξ	the universal set
$\emptyset$ or $\{\}$	the empty set (a set containing no elements)

Venn notation

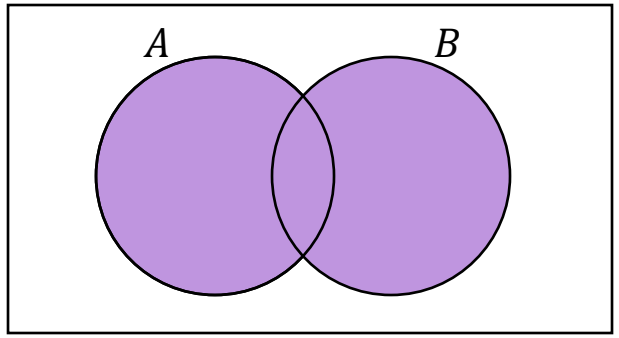


The **intersection** is where two sets overlap.

$A \cap B$

This means A **and** B.

AND rule

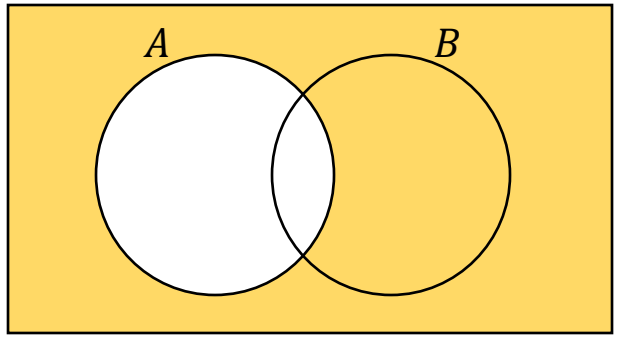


If you put two sets together, you get the **union**.

$A \cup B$

This means A **or** B.

OR rule



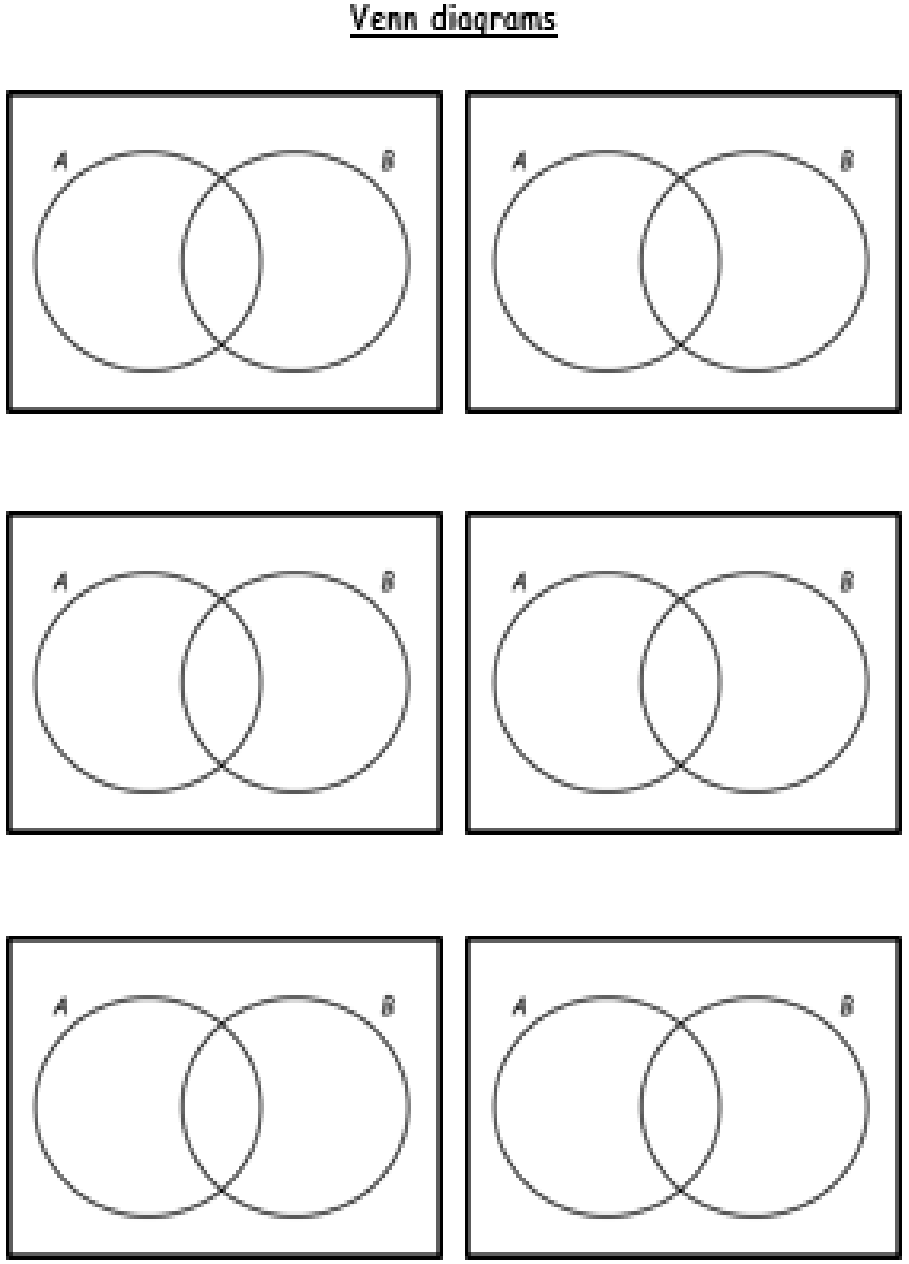
The **complement of A** is the region that is not A.

A'

This means **not** A.

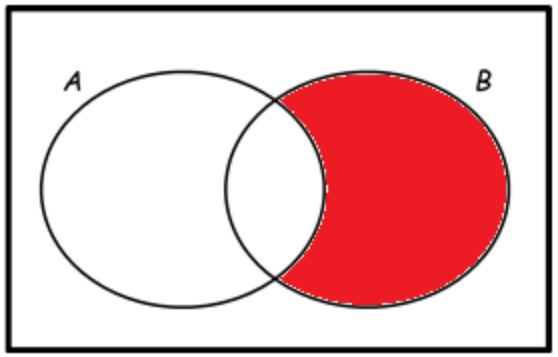
Task

Use your pieces of tracing paper to correctly shade the Venn diagrams.

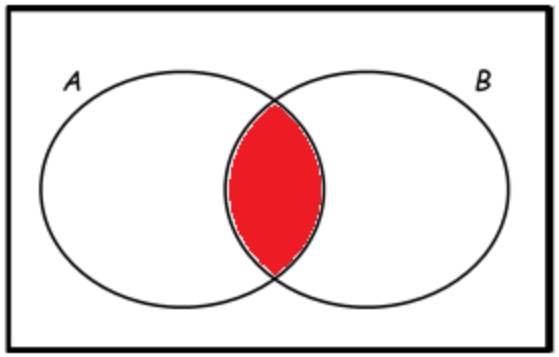


Answers

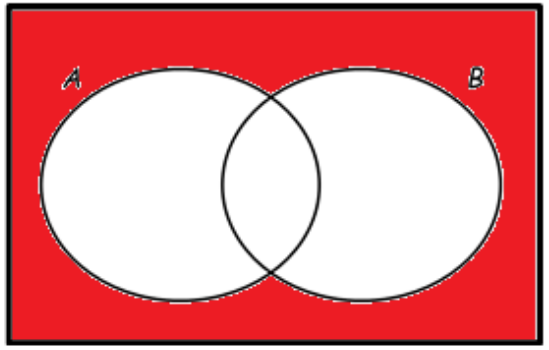
$A' \cap B$



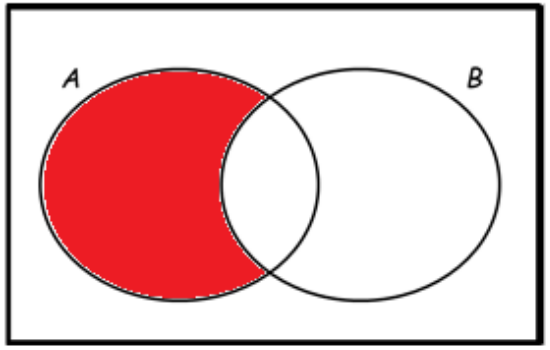
$A \cap B$



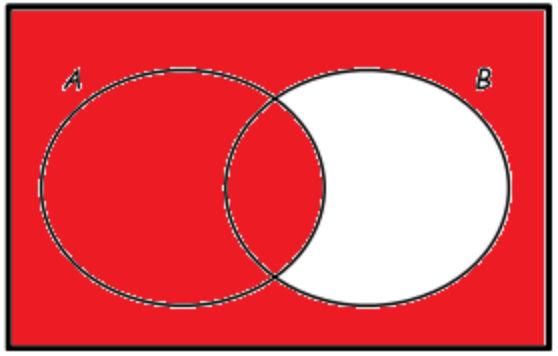
$A' \cap B'$



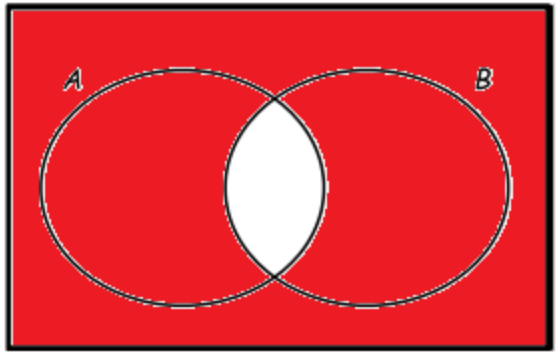
$A \cap B'$



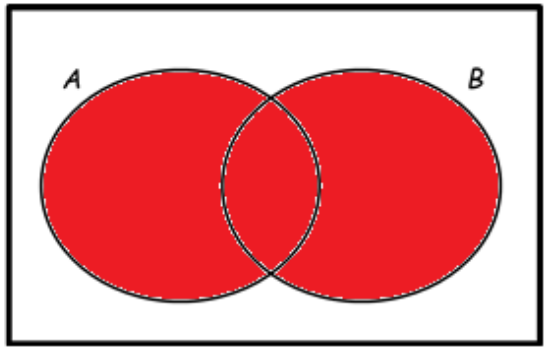
$A \cup B'$



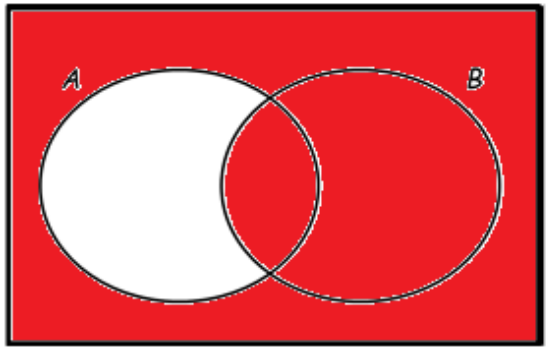
$A' \cup B'$



$A \cup B$



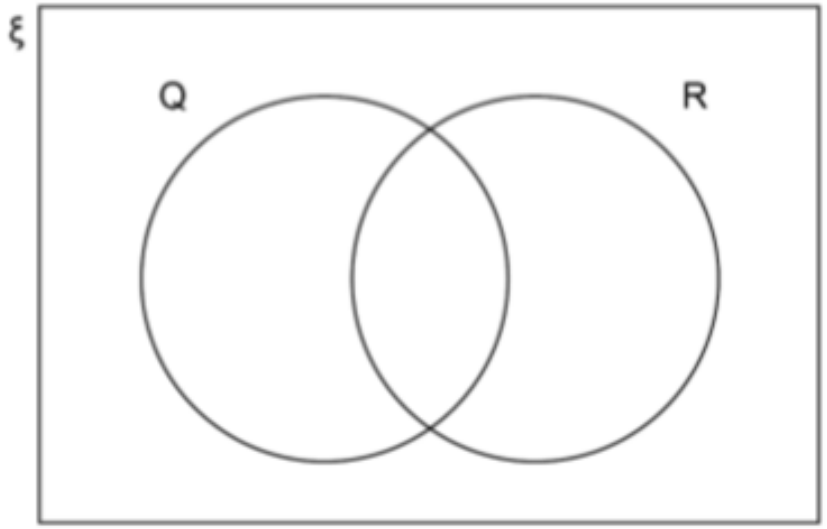
$A' \cup B$



Exam questions

Here are five shapes, A to E.

A	Parallelogram
B	Regular pentagon
C	Rhombus
D	Scalene triangle
E	Trapezium



In the Venn diagram,

ξ is the set of all shapes

Q is the set of quadrilaterals

R is the set of shapes which **always** have rotational symmetry.

Complete the Venn diagram with the letters A to E.

[3 marks]

Nov 2018 Paper 1

Exam questions

50 students are asked if they study Geography or History.

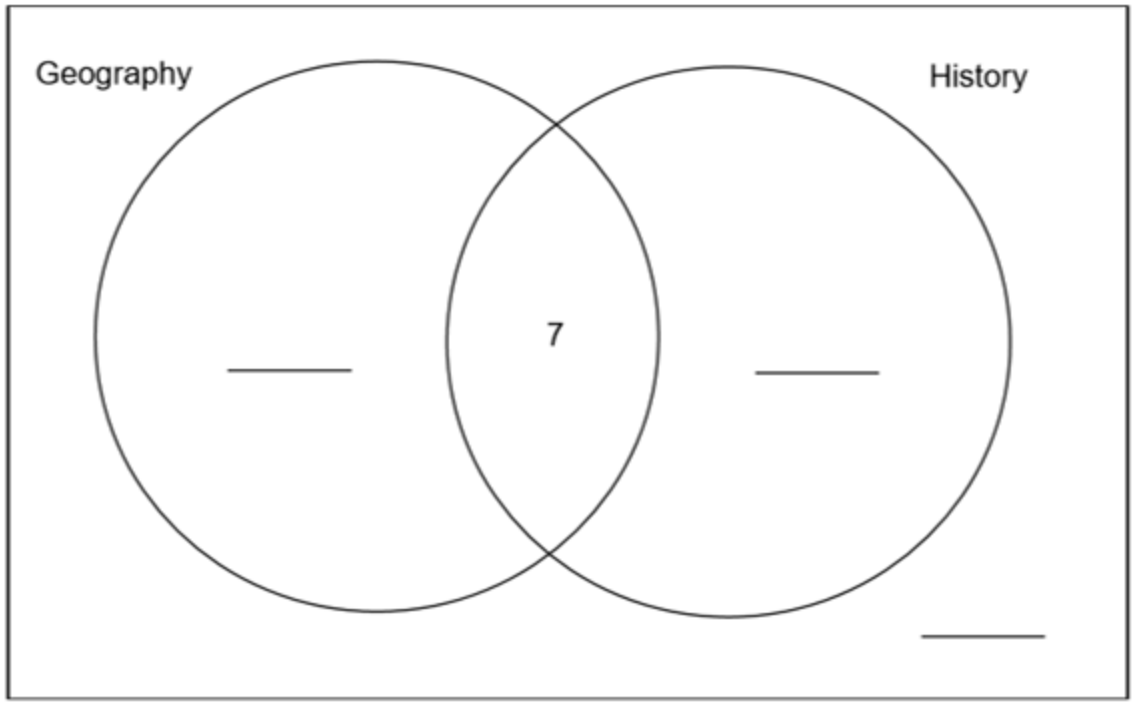
The Venn diagram shows some information about their answers.

What does the number 7 on the diagram represent? **[1 mark]**

20 students study Geography but **not** History.

19 students study History.

Complete the Venn diagram. **[3 marks]**



Specimen 2 Paper 1

Exam questions

What does $(A \cap B)$ represent in $P(A \cap B)$?

Circle your answer.

[1 mark]

A or B or both

A but not B

not A and not B

A and B

Nov 2018 Paper 2

Exam questions

$\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

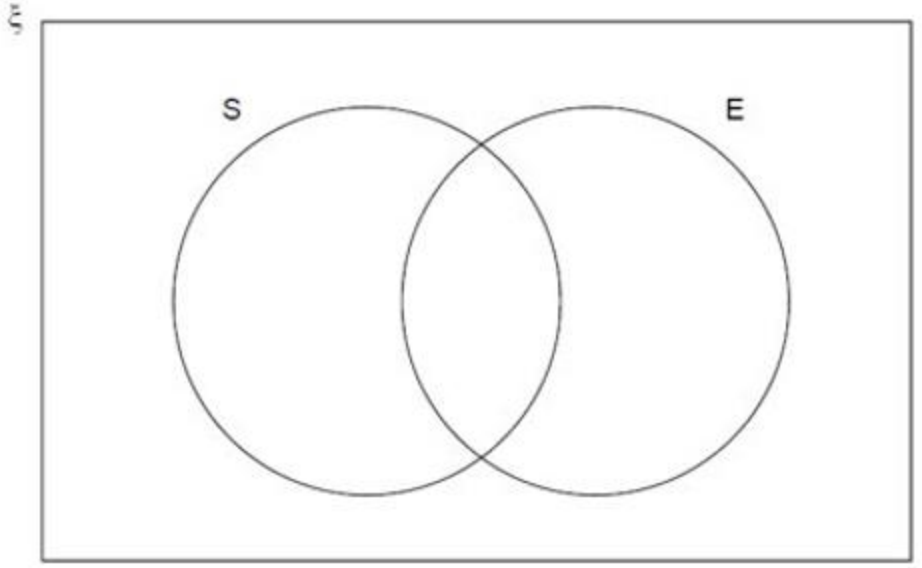
S = square numbers

E = even numbers

(a) Complete the Venn diagram. **[3 marks]**

(b) One of the numbers is chosen at random.

Write down $P(S \cap E)$ **[1 mark]**



Specimen x paper 2

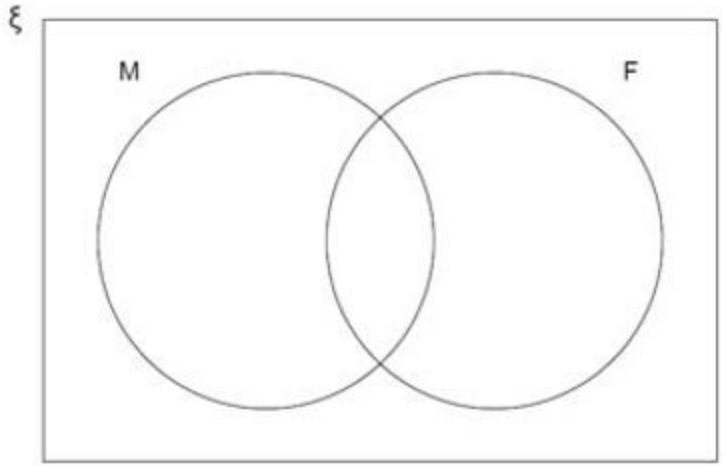
Plenary

In the Venn diagram

ξ = Whole numbers from 1 to 12 inclusive

M = Multiples of 3

F = Factors of 24



(a) Put the numbers from 1 to 12 in the Venn diagram. **[3 marks]**

(b) Complete the table to show **how many** numbers are in each part of the Venn diagram. **[3 marks]**

	Multiples of 3	**Not multiples of 3**	**Totals**
Factors of 24			
Not factors of 24			
Totals			12

Specimen 4 paper 2